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A Timely Message from Supreme President Allen

Grand Rapids, Mich., August 22nd, 1922.

To Branch Officers and Members:

With the coal strike in process of settlement and the R. R. strike settlement in sight, conditions appear very favorable for an early increase in all lines of manufacture.

Our A. E. S. should prosper accordingly. It should not be at all difficult to secure nearly every qualified electroplater as a member of his nearest branch.

It is the desire of the Executive Committee that every such man should be secured as a member in order that our growth of past years should be duplicated or, if possible, exceeded.

Yours very truly,

WALTER J. ALLEN,

Supreme President.

MONTHLY REVIEW

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EDITORIAL

LITTLE THINGS

Do you remember the verses about the importance of a horseshoe nail? They run something like this:

For the lack of a nail, a shoe was lost,
For the lack of a shoe, a horse was lost,
For the lack of a horse, a rider was lost,
For the lack of a rider, a battle was lost,
For the lack of a battle, a kingdom was lost,
All for the want of a horseshoe nail.

In no line of endeavor is attention to little things more important than in the work of the electro-plater.

Frequently excellent plating equipment and installations have been almost worthless, not because the big parts were not of the right kind, but because some minor part was overlooked, or because some carelessness was allowed in making solutions, or perhaps some foreign substance was allowed to get into the solutions because some one thought that the cleaning of a crock or vat was too little a thing to take seriously.

Sometimes additions are made to plating solutions and the quantity guessed at rather than accurately measured, with the remark, "That is near enough," but the result was that the guess was just enough more than was needed so that the solution would not plate well, if it plated at all.

There are ever so many ways in which the importance of giving attention to details, or the little things, are emphasized in the experience of the successful plater, that little things are no longer considered little things and frequently become the most important factors in successful plating.

We would suggest that the plater keep in mind that it is the little things so called that frequently make or break a successful plater, therefore give attention to the little things if you would continue to have success.

THE PURITY OF NICKEL SALTS[1]

By M. R. Thompson and C. T. Thomas[2]

[1]Published by permission of the Director of the Bureau of Standards of the U. S. Department of Commerce

[2]Chemist and Assistant Chemist, Bureau of Standards, Washington, D. C.

I. INTRODUCTION

During recent years the Bureau of Standards has received numerous inquiries from various sources regarding the effect of impurities upon nickel deposition and the amounts of such impurities that may be allowable in commercial nickel salts. To establish a basis of discussion between producers and users, rather than to attempt to set up an arbitrary standard of quality, a number of samples of nickel salts have been analyzed. It was apparent from the results obtained that there exists a very great variation in the purity of this material. A study was also made of the effect upon the deposit of varying amounts of several of the principal impurities found to be present. Combining the two investigations, a tentative specification for the purity of nickel salts was drawn up.

It must be recognized that the attainment of a very high degree of purity might cause a prohibitive increase in cost. A fair proportion of the samples examined, however, would pass the specification and several samples of commercial material were entirely free of the most troublesome impurities. This situation ought to exclude the question of increased cost from the present discussion.

SECRETARIES—PLEASE TAKE NOTICE

The REVIEW goes to press 25th day of the month. Please plan to have your items in Editor's hands not later than 18th day of the month. We desire to have all news items up to date. Your co-operation will be appreciated.

—Editor.

II. COMPOSITION OF COMMERCIAL NICKEL SALTS

Table 1

Analyses of Nickel Salts

A—Nickel Sulphate (Single Salt)

Sample No.	% Zinc	% Copper	% Iron	% Free Acid
1	—	.011	—	—
2x	—	.039x	—	—
3x	—	.005	.130x	.020
4	—	—	.045	.015
5x	.120x	.050x	.020	.210x
6	.044	.014	.040	.040
7	—	.018	.100	.025
8x	.088x	.010	.110x	.075
9[1]	.010	.016	.100	—
10x	.016	.024x	.070	—
11x	.010	.034x	—	—
12x	.010	—	.120x	—
13	—	.005	—	—
Average	.022	.017	.057	.030

[1]Samples 9-12, inclusive were from four different barrels of the same shipment.

xSamples marked x would be rejected by the specification proposed in Table 4.

B—Nickel Ammonium Sulphate (Double Salt)

Sample No.	% Zinc	% Copper	% Iron	% Free Acid
14x	—	.045x	—	—
15x	—	.058x	.025	.030
16	—	—	—	—
17x	.028	.050x	.035	.070
18	.010	.017	.024	.070
Average	.008	.034	.017	034

xSamples marked x would be rejected by the specification proposed in Table 4.

The amounts of insoluble matter and of chloride were usually very small. No appreciable amount of arsenic could be detected in these samples. Magnesium sulphate

may be present; one otherwise very pure lot contained over four per cent. This substance has sometimes been added to the bath as a "conducting salt" and is not known to have any injurious effect, but its presence in nickel salts is undesirable from the standpoint of lowering the nickel content of the latter. Small amounts of cobalt sulphate are often found. The properties of nickel and cobalt are so nearly alike that small amounts of the latter could hardly be important. No other impurities were included in the present investigation, our conclusion being that zinc, copper and iron were the principal impurities to be considered.

III. EFFECT OF IMPURITIES UPON THE NICKEL DEPOSIT

A number of deposits were prepared using still solutions of the following composition:

Table 2

Composition of Nickel Baths

	Normality	g/L	oz/gal
Nickel Sulphate (7 H_2O)	1.00	140	19
Ammonium chloride	0.25	14	2
Boric acid	0.25 (M)	16	2

Commercial 95-97% nickel anodes were used and the deposits were made upon brass plates at a cathode current density of 1 amp./dm^2 (9.3 amp./sq. ft.). The time of deposition varied from one to twenty-four hours, sometimes longer, as it was desired to collect data useful in the electrorefining of nickel and the production of heavy deposits as well as in the electroplating of very thin deposits. In discussing the results, due allowance will be made for the thickness of the deposit. The acidity of the bath was controlled by means of indicators. The baths were prepared from a lot of very pure nickel sulphate and to each bath a known amount (in the form of the sulphate) of the impurity to be studied was added. Other factors were probably not of great importance in this work and will not be discussed, as commercial conditions vary considerably and our experiments were conducted solely with the idea of collecting data that would apply to them in a general way. The results of the experiments are briefly outlined as follows:

Zinc

0.03% Zinc in Nickel Sulphate. Deposits satisfactory.

.09% Zinc in Nickel Sulphate. Deposits satisfactory. No certain effect of zinc was noted in these first two experiments.

0.20% Zinc in Nickel Sulphate. Possible tendency toward bright edges and pitting, but rather good deposits on the whole.

0.30% Zinc in Nickel Sulphate. Distinct tendency toward bright edges, bright splotches on surface and pitting. Deposit very smooth and little, if any, gassing.

0.44% Zinc in Nickel Sulphate. Strong gassing from the start of deposition. Deposits loose, black and scaly from the start.

Copper

0.005% Copper in Nickel Sulphate. Deposits satisfactory.

.025% Copper in Nickel Sulphate. Deposits satisfactory.

No definite effect of copper noted in these first two experiments.

.050% Copper in Nickel Sulphate. A few small dark trees, or "burrs," near bottom edge.

.100% Copper in Nickel Sulphate. Treed all over, with dark gray spongy deposit at bottom.

.500% Copper in Nickel Sulphate. Deposits as above, but highly exaggerated.

The first noticeable effect of zinc seems to be a tendency toward bright edges and smooth, lustrous deposits. An increased amount of zinc brings out bright lines, spots and patches, also pits, although the latter may be separate from the bright spots. Excessive amounts of zinc cause gassing at the cathode, attended by a very characteristic loose, black, scaly deposit, which is apparent from the start of deposition.

The first noticeable effect of copper seems to be a tendency toward a darkening of the deposit and slight roughness near the bottom edge, caused by scattered dark trees or "burrs." Pitting is also likely to appear. A large amount of copper causes this roughness to spread all over the cathode. Excessive amounts of copper cause, in addition, a very spongy dark grey voluminous deposit at the bottom. These effects are quite characteristic. There seems to be no

especial tendency toward gassing at the cathode.

In both cases, where moderate amounts of the impurity are present, a deposit may appear normal at the start, but gradually get poor as it becomes thicker. If the concentration of the impurity is great enough, a deposit will be poor from the start of deposition.

Commercial nickel anodes contain copper, usually from 0.10 to 0.25%. It has been found, however, that most of this copper goes into the anode sludge rather than into solution. The necessity exists, therefore, of restricting the copper in the nickel salts, whether or not copper is present in the anodes.

It is believed that maximum amounts of 0.05% zinc and 0.02% copper constitute a reasonable specification for these metals at this time. Copper seems to be the more troublesome impurity of the two and therefore the limiting amount is made lower than in the case of zinc. Larger amounts than these may be present without causing poor deposits, but a fairly wide margin of safety is necessary, both on general principles and because the occasional addition of salts to the bath might produce an accumulation of an impurity at any time (especially in the case of zinc, which deposits after nickel according to the electro-chemical series). The amounts suggested refer especially to thin plating deposits and it would be advisable to have even lesser amounts present when very heavy deposits are being made.

Iron. The study of iron has not yet been completed and it is planned to conduct an extended investigation, the results of which will be published later. Preliminary indications are that iron makes the nickel deposit whiter in color and finer-grained in structure, therefore presumably harder. Iron in the solution in the form of ferrous sulphate has a strong tendency to deposit and several per cent. of iron will often be found present in commercial nickel deposists. More would be present if ferrous sulphate were not constantly oxidizing, resulting in the precipitation of a basic ferric salt, which is usually the cause of the turbidity of nickel plating baths. There are indications that this precipitate may tend to cause porous nickel deposits.

Most European writers regard curling and cracking as principally due to iron and advise a periodical removal of

iron from the bath. We have made a number of heavy deposits containing up to 7% of iron, without the occurrence of curling or cracking. It does not seem possible to state definitely at the present time and with the limited knowledge of the subject available, whether iron in the nickel deposit is advantageous or objectionable.

All the 95-97% anodes used in this country contain iron, usually from 0.5 to 1.5% and the 92% anodes, still used by some platers, contain 5 to 6% of iron. The plating bath, therefore, always contains in solution as much iron as can remain under the operating conditions. In view of this fact, it is obviously not justifiable to attempt the complete exclusion of iron from nickel salts. The limiting amount of 0.1% that we are proposing, is equivalent to 0.5% in anodes and is believed to be a reasonable requirement until anodes can be made with a lower content of iron than 0.5%.

Free Acid. This is estimated as free sulphuric acid. The presence of a very large amount of free acid may be an indication of insufficient purification of the salts and it is noticeable that the sample containing the largest amount (number 5) was also badly contaminated with zinc and copper. Free acid may attack the wood or paper of containers and thereby produce soluble organic impurities that are troublesome in the bath. On the other hand, small amounts of acid are hardly deleterious in themselves, since boric acid is usually added to the bath and the hydrogen ion concentration, or degree of acidity, largely established by the boric acid, is of more importance than the total acidity. It is believed that a maximum of 0.1% free acid is a reasonable specification; this amount was exceeded only in the case of one sample (number 5).

IV. PROPOSED SPECIFICATION FOR NICKEL SALTS

Table 3

Suggested Upper Limits of Impurities

If Calculated As	Not Over	If Calculated As	Not Over
Zinc	0.05%	$ZnSO_4.7H_2O$	0.22%
Copper	.02	$CuSO_4.5H_2O$	.08
Iron	.10	$FeSO_4.7H_2O$	.50
Free Acid	.10	H_2SO_4	.10
			0.90%

Nickel in "Single Salts" not less than 21.39%	
Equivalent to $NiSO_4$ with "6.5 H_2O"	99.10
	100.00%
Nickel in Double Salts not less than 14.72%	
Equivalent to $NiSO_4 . (NH_4)_2SO_4 6H_2O$	99.10
Impurities, as above,	0.90
	100.00%

Since nickel sulphate contains either 6 or 7 molecules of water of crystallization, according to the conditions of manufacture, storage, etc., the nickel content has been calculated on the assumption that an equal amount of both compounds may be present, or, in effect, the salt as used will contain an average of "6.5 H_2O".

Owing to this uncertainty in the case of the single salt and the possibility of some efflorescence or deliquescence in either case, it should be emphasized that the specification of th nickel content is no criterion of the purity of the salts and is useful only in assuring that a definite amount of nickel is obtained.

V. PURIFICATION OF CONTAMINATED NICKEL BATHS

When a bath contains copper, it is common practice to remove this impurity by making the bath slightly acid and precipitating the copper upon scrap iron (or nickel) suspended in the bath. The same result is also secured by cleaning the anodes and allowing the copper to precipitate upon them while no current is passing. We have found that such copper upon the surface of the anodes tends to largely redissolve when deposition is resumed (the copper contained in the material of the anodes, as previously noted, tends to enter the anode sludge). It is obvious that with this method, the anodes should be cleaned again before further deposition.

It has been known for some time that neutralizing the bath with nickel hydroxide, or carbonate (together with agitation with air to furnish oxidizing conditions) will precipitate all the iron from the bath. We have noted during this work that such a neutralization will usually also remove the effect of any zinc or copper present. After readjusting the degree of acidity, it is advisable, especially in the case

of zinc, to electrolyze at a high current density for a few hours to insure complete removal. Sometimes a second treatment is required. Filtration, or decantation of the solution is not absolutely necessary after the treatment, as the precipitated impurities do not tend to redissolve rapidly. Filtration is, however, desirable as an added precaution when the facilities are available.

VI. CONCLUSION

It is believed that, if the above specification is found to be consistent with the experience of those engaged in nickel deposition, there will be no serious difficulty in getting the co-operation of manufacturers in producing salts of the desired purity. In connection with the furnishing of samples of salts to be analyzed, several manufacturers have assured this Bureau of their willingness to assist in maintaining a high standard of purity for this material. The authors wish to acknowledge the courtesy of numerous firms in furnishing samples and information regarding their products, and to express their appreciation for the assistance of Mr. J. H. Winkler in preparing the electrolytic deposits and for suggestions and advice from Dr. William Blum, under whose direction this investigation was conducted. Valuable suggestions were also received from Mr. George B. Hogaboom, Electroplating Adviser to the Bureau of Standards, and from the Research Committee of the American Electro-Platers' Society.

NEW RESEARCH COMMITTEE

Grand Rapids, Mich., September 16th, 1922.

To Officers and Members A. E. S.:

After long consideration of the matter which included consultation with many of the leading and influential members I hereby appoint the following members as the Committee of Research and Education:

William Delage.....Waterbury Branch, Chairman
O. J. Sizelove.....Newark Branch
E. G. Lovering.....Detroit Branch

WALTER J. ALLEN,
Supreme President.

ONE PHASE OF PLATING BUMPER BARS

By Mr. E. V. Allen of E. V. Allen Co., North Chicago, Ill.

The development of the automobile caused the development of a bumper bar, and with it always the necessary methods of handling the particular style and kinds of bumper bars which have been made for all sorts of machines.

In my experience covering a great many years I have naturally had a considerable insight on different kinds of plating and in recent years it has been my privilege to handle two or three very good-size bumper bar plants, and the methods used, as explained below, have been very successful indeed.

I have tried various methods such as copper-plating, zinc-plating and then nickel-plating, and have at last come down to the following method: Use a cyanide zinc solution, give a good covering coat of zinc, then brass-plate, taking directly from the zinc to the brass solution without rinsing. According to the nature of the work, we sometimes buff the brass-plate and sometimes after thoroughly rinsing, give it direct nickel. The brass solution should be plating uniform and of a sufficient coating to thoroughly cover. We use copper anodes in our brass solution. If you do not get a sufficient coating of brass you are apt to have black streaks, and if you overcome this with a strong current it is apt to cause blistering.

I always use the following method for brass solution: Get a good working alkaline copper solution and gradually put in enough zinc carbonate to get the desired color; when it gets to be about the right shade I heat it up, work it with all the excess current that I can, test it out when cold, and follow this method until I get the desired shade.

I use absolutely no ammonia or arsenic in my solution, and if this solution is worked every day, it requires very little attention. I have the rapid nickel solution, and consequently have to put a good coat of brass on or it would have black streaks.

I use 25 per cent of double to 75 per cent. of single salts in my nickel solution, 2 ounces of common salt and 2 ounces of boric acid to the gallon, and keep the solution from 12°b to 14°b. However, if the ordinary nickel solution

is used it would not be so apt to show black streaks. I give the bars about 45 minutes, or in other words, a bath an hour, which gives us 48 bars per hour.

About five years ago I installed a method in one of the shops I had in charge, and from a recent report, I find that they are still using the same process with the exception that they use copper instead of brass. This is used in an automobile factory which gets accessories from various other firms, and every month pieces of different parts are given a salt-spray test, and this method is the only one that stood up.

As I have only recently installed this method of using brass instead of copper, I cannot guarantee it, although it has every indication that it is a better method than using copper. I wrote to the Bureau of Standards in Washington, D. C., also the Metal Industry, with the following reports:

From the Bureau of Standards: "We have never made actual experiments upon the absorption of brass or copper by zinc coatings. We have been informed, however, that when sheet zinc is plated with brass and exposed to very high temperatures, as e. g., on parts of lighting fixtures, there is a tendency for the brass to be absorbed by the zinc. Probably this reaction occurs more slowly at an ordinary temperature. If the conditions are favorable for its absorption we have no reason to believe that the presence of nickel plating over the brass would necessarily prevent or diminish the absorption of the brass. On the other hand, we are not certain that even if such absorption occurs it will materially reduce the protective value of the coating. Any copper in contact with the zinc, even in the adjacent coating, will tend to accelerate corrosion of the zinc if the latter is exposed, but it is doubtful whether such action would be much more pronounced even if the copper from the brass coating were actually absorbed by the zinc. In general the use of copper coatings in contact with zinc is undesirable, as it diminishes the protective value of the zinc."

From the Metal Industry: "We do not believe an electro-deposit of zinc upon a steel auto bumper would absorb a deposit of brass if fairly heavy. Of course, there would be no distinct advantages in depositing brass upon the zinc except that it would be somewhat easier to deposit the

nickel upon the brass surface than upon the zinc. The zinc surface, however, is the rust-proofing factor, not the brass or the nickel. But the nickel gives a more pleasing finish and at the same time prevents oxidation of the surface of the zinc."

A certain scientist said that a certain thing couldn't be done; one d—— fool didnt know it couldnt be done and went ahead and did it. I was that d—— fool and I brought it to a success.

The reason why it seemed to be the universal belief that you could not plate upon zinc with the brass or copper is from the fact that so many stove urns were made of solid zinc, and as there is considerable heat there, it would naturally quicken the process of absorption.

One reason why I have had success with this is because I do not let the zinc-plate dry.

BRANCH NEWS

Chicago Branch

Enclosed is essence of regular monthly meeting of the Chicago Branch, A. E. S.:

The meeting opened with President Bott presiding and a large gathering of the A. E. S. clan, and while the evening was hot the attendant members divested themselves of their coats and went to work.

It is with profound regret that we hear from our esteemed Chicago Branch member, William S. Moore, he is ill at Hinsdale Sanitarium, Hinsdale, Ill.

We received five applications for membership to our branch at this meeting and our President says he is going to get a couple more for next meeting.

Our question box was light owing to the expectation of a very lengthy discussion on the specific subject for the evening, "Cleaning and Preparing Steel and Die Castings for Enameling," as written by Mr. Jacob Hay, a member of Chicago Branch, A. E. S. This paper will be turned into review when librarian gets it off his table of discussions. The subject for September 8 meeting is a paper on "Corrosion of Metals," by O. E. Servis, Past President. Our new addition of special subject is helping to interest the boys in paper writing practice.

Chicago Question Box

No. 1—What bad effects will follow use of amonia in a brass solution? Ans.—It was thought that too much amonia had some effect as too much free cyanide.

No. 2—What is a good chemical for use in a zinc solution to make deposit whiter? Ans.—It was thought that aluminum sulphate was best and 2% to the gallon of solution.

No. 3—How can silver be removed from a silver strike? Ans.—It was thought best to prec'pitate with zinc.

No. 4—Is nickel solution to acid when it shows red on litmus paper? Ans.—Yes, if the paper is deep red and not pink. Some of the platers using this paper should note the color changes of litmus when testing solutions for acid, as what is determined a metral nickel will turn litmus pinkish or light red. Very easy to make a mistake.

No. 5—Wanted dope about acid strip, using glycerine for stripping silver? Ans.—A member volintarily gave as follows: Dilute sulphuric acid with water until stand 50 to 55% Beume, then add 1 oz. glycerine. The material stripped from articles of silver will be precipitated as a kid of a metalic sludge, which, if dissolved in nitric acid, can be precipitated in usual way.

Bridgeport Branch

Our September 8th, 1922, meeting was held with a very good attendance, J. W. Slattery in the chair.

One applicant was elected to associate membership. Mr. R. Daybill was granted a transfer to the Connecticut Valley Branch. Mr. Hogaboom told us of the good time we are to have at Lake Compounce on the 23rd day of September.

Our new member, Frank Townsend, gave us a short talk and was given a vote of thanks upon conclusion. Mr. George Belie brought a board of finishes which are to be exhibited at the Chemical Industries Exposit'on at New York City. It was agreed by all present that it was an excellent sample which George may well be proud of.

Meeting adjourned at 10:30 P. M. and the boys are all set for the big time in the near future.

Detroit Branch

Regular and open meeting of Detroit Branch, A. E. S., was held at B. of C. Building, Wayne and Lafayette Boulevard, on Friday, September 1, 7 P. M. A spirited discussion on a formula and method of plating die castings, with large percentage of zinc, submitted by B. E. Miller.

B. E. Hengst of Cleveland told us how he was plating aluminum lamp doors with a very heavy deposit of nickel that stood a saw test of the hinge without stripping. Plating them in 18 minutes with 4½ volts, 220 amp, on aprox. 12 square feet, which is going some.

H. S. Brockway also told us his method of plating aluminum die castings. Space will not permit the details of these methods. Chas. Cunningham asks why zinc rims plated in a sulphate solution, that are white when removed, after 24 hours show signs of rust in under bead and around holders. He also has the answer.

Mr. Morgan Plater for Commonwealth Brass Co. and Mr. Gondy, chemist for Kelsy Wheel Co., made application for membership.

Detroit Branch expects to secure laboratory and polishing and plating equipment at Cass High in the near future.

Meeting adjourned at 10:30 P. M. Both meeting and dinner were very much enjoyed by all present.

Milwaukee Branch

Our regular meeting was held August 10th, with a very good attendance. President R. Goodsell presided.

One applicant was elected to membership.

Our picnic was held at Crystal Spring Park, Cedarburg, Wis., Sunday, August 20th, and a very good time was in store for everyone. The committee spared no time or expense for the enjoyment of its members or friends who attended. There were games for the youngsters, ladies and men. There was dancing in the pavilion. The music was furnished by the best concertina players of Milwaukee. There also was a large attendance of out-of-town members. Everybody enjoyd the day.

St. Louis Branch

Our annual outing for families of our members was held at Belleville on August 5. We had a good crowd and a jolly one. C. Coderhandt and C. Weygandt helped us reach the grounds and acted as hosts. Swimming, games and contests were part of the program. Hedley Richards, championt quoit artist, failed to appear, so George Lamkemeyer and J. H. Jordan carried off the honors. Prizes were awarded to G. Lamkemeyer, S. Sprague, Mrs. F. Menniges, Mrs. E. J. Musick, Frank Menniges, Jr., and Robert Deubelbeis as winners in contests. President Frank Horath and Ed. Musick, chairman of committee, kept things going and all had a good time.

Meeting of members was called to elect one new member and accept two applications.

Cleveland Branch

At our last regular meeting the principal subject discussed was nickel plating on aluminum. The same to be done on a productive basis. The matter was gone into most thoroughly and various suggestions and methods advocated for this particular job were formulated and will be tested out so that results obtained will be reported at our next meeting. Needless to say that discussion of nickeling aluminum will be the principal subject to entertain our intellects at the September meeting. The branch also contemplates holding a banquet in November to commemorate the eight anniversary of founding the Cleveland Branch. It was also arranged that we hold an open meeting a couple of weeks previous to the banquet, and in order to make this a sort of a booster meeting we will invite manufacturers, platers and others that we consider would be interested, to ours as well as their own interests, to attend. Over 400 invitations will be sent out for this meeting, and as an additional inducement to make it interesting to all we are negotiating having Mr. Kolp, electrical expert, from Dayton, O., give one of his very interesting lectures on corrosion of metals, etc., including his photographic views of his experiments. Mr. Kolp lectured to the Detroit boys about a year ago and they are still talking about it in that town. We have heard that Mr. K. has several new wrinkles to spring that will add interest to the meeting. We hope that this booster meeting will also boost our membership, for this branch owes it to itself and the A. E. S. to get out now and hustle and do some-

thing, for this is virtually the best town in the country to dig up platers in, as firms manufacturing metal products are more diversified than in any other city of this size. Here is hoping we make a hit.

Philadelphia Branch

Our regular monthly meeting was held September 1, 1922, with President Gehling in the chair.

Plans are being arranged for our annual banquet to be held November 25, 1922. The following committee was appointed: Messrs. Uhl, Asimiesa, Barr, Bayer, Bell, Tower, Metz, Mott, Gabrylewitz, Kies, Keiff, Rathbone.

Mr. D. Jacques Benoliel will speak at the October meeting on cleaners. As Mr. Benoliel is well versed on this subject it will be of great interest for each member to be present.

Chicago Branch

Chicago Branch, A. E. S., held regular monthly meeting on September 9th, with President Bott presiding and all regular officers present, and a large attendance of members. Several of our old out-of-town boys were there; also some of newly made members.

We were glad to see C. A. Barnes in our midst again after a year of trouble with his eyes, and he surely looks fine.

The librarian had following in the question box:

Question 1—How can effects of too much arsenic be overcome in a brass solution and how can it be removed?

Answer 1—It was stated that there is a method of removing it with magnesia, but it is a long process for commercial workers. It was suggested to dispose of the solution if it was too thoroughly saturated, as it would always have a gray cast to the brass.

Question 2—What causes nickel solution to plate dark when acidified and what is the remedy?

Answer 2—Lack of metal, lack of current, presence of too much copper or zinc, and too much metal will do this and it was found in this case diluting the solution cured the ill, lessening the metal content.

Question 3—What is best ball burnishing medium, whale oil soap or soap chips, or what other medium can be used?

Answer 3—It was thought that either were good when prepared correctly, dissolving to consistency of soft soap by boiling in water until jellied, then adding soda ash or caustic soda as the operator wishes, and then when filling barrel use this mixture for lubricant.

Question 4—What causes silver deposits to peel and blister after several days and what will prevent it?

Answer 4—After inquiring it was ascertained that this was on die casting material and we found these to be what is known as aluminum die casting. It was found that this metal will do this when the aluminum content is high. It was suggested to strike in hot copper and nickel first and it would help overcome this.

Question 5—Can results be obtained from a silver solution standing 86% which otherwise is standard solution and what effect will it have on soldered work?

Answer 5—It was thought that a regular standard solution at this degree of heat is liable to flake and by reducing resistance by either cooling with ice or reducing the metallic content and using moving cathode it would not flake at soldered parts.

Question 6—Is there such a solution as a German silver solution. If there is, what is the formula and process of depositing?

Answer 6—One member stated that he had a formula but never worked it and would bring it down and let the boys tear into it and see if they could work it out.

Newark Branch

On Friday evening, September 15, Newark Branch, A. E. S., held its regular meeting with Mr. O. J. Sizelove in the chair, with 16 members and one visitor present. Minutes of the previous meeting were approved as read. Communications and bills were ordered received, filed and paid. Mr. Henry Bergfels spoke a few words concerning the welfare and health of Mr. C. H. Buchanan, a member of New York Branch, which is not of the best, he being confined to his home.

On a motion which was carried the president appointed a committee, composed of Messrs. Smith, Reuter and Clark, to interview the director of the Board of Education; also the Newark Technical School and ascertain if we can secure a room where we can hold our meetings of the laboratory class.

Mr. P. Sievering gave a short talk on his 1,400-mile auto trip through New York State up to Vermont.

Mr. Harry Johnquest of Waterbury was a visitor and gave a short talk upon the presence of copper and zinc as impurities in a nickel electrolyte. He stated that to test nickel salts for copper a very good method is to dissolve 1 oz. of nickel salts in about 300CC of H_2O acidulate with H_2SO_4, then pass hydrogen sulphide through the solution. If copper is present, even in minute quantities, a black precipitate will appear.

To detect zinc acidulate with acetic acid and proceed as for copper.

Mr. Carlson is endeavoring to secure as a speaker at one of our near future meetings an expert in the deposition of copper upon non-metallic objects.

Discussions upon the following subjects took place: "Thick deposits of copper upon non-metallic substances," "White gold deposits," "Plating oxidizing."

Question was asked if aluminum can be deposited in a cayanide gold bath? Can any member enlighten this member on this subject in order that he may secure a white gold bath by adding aluminum?

Mr. Sievering, Johnquest, Reuter and Clark gave a few remarks upon their trip to the Chemical Industries' Exposition held in New York City.

Meeting adjourned at 10:50 P. M.

Dayton Branch

The annual picnic of the Dayton Branch of the A. E. S. was held on August 5th, at Dorothy Camp, Hills and Dales. It was the most successful picnic ever enjoyed by the Dayton Branch, considering the attendance and enjoyment had.

From two until six the members and their families, to the total number of one hundred, played numerous games and held contests. The feature game of the day and one which created the most hilarity was the "sealed orders'" race. The participating couples were required to do numerous stunts, described in orders received at the start and along the course of the race. The first couple completing the orders and reaching the goal received a prize.

At six o'clock a basket lunch was spread, several ladies meanwhile preparing coffee. Short, humorous talks by several of the members and music lent pleasure to the meal. Ice-cream and refreshments were served throughout the day as a treat by the members of the branch. The committee on arrangements, made up of M. G. Kopf, J. E. Lamareau, C. Van Derau and Walter Fraine, were responsible for the success of the affair and were warmly praised by the gathering.

On September 9th, the members of the Dayton Branch held a combined regular monthly meeting and social event in Springfield, O. The members and their families assembled at the Y. M. C. A. and motored the twenty-seven miles to Springfield, having a most enjoyable time en route. They were met at Snyder Park by the Springfield members who belong to the Dayton Branch and enjoyed a couple of hours playing games. The ladies renewd the acquaintanceship made at the picnic and otherwise enjoyed themselves. At five o'clock a parade was had through the city to the Y. M. C. A. Here a splendid dinner was arranged by the Springfield ladies. The discovery was made that the vice-president of the Dayton Branch and a resident of Springfield, Mr. H. J. Harter, had had a birthday the day previous. This fact was the occasion for much hilarity and a surprise was sprung by the Dayton men by presenting Mr. Harter with a splendid gift.

After the dinner the men folks assembled for the regular meeting, the ladies meanwhile attending a moving picture show as the guests of Springfield. M. G. Kopf presented a paper for the educational program of the meeting on "Electricity in the Plating Room." The theory and operation of electric generators was explained and several interesting demonstrations were made. The feature of the program, however, was the exhibition of an unusual specimen of a natural magnet obtained from Asia Minor. Mr. Kopf called attention to the similarity between the energy obtained from this material and that of radium. A lively discussion terminated the meeting.

Other than the enjoyment had by the members on both of the above occasions I would like to call your attention to the fact that, through suitable newspaper announcements, and pictures which appeared before and after the events, and as well as through the parade, the Dayton and Springfield electro-platers received considerable publicity which has the effect of letting their employers know that they are on the map alive and

doing something, and also assists in getting prospects for new members. We are determined this year to get a 100% membership for this territory, and we are going to initiate real publicity and educational programs for this purpose. We suggest that other branches initiate publicity programs likewise along the lines indicated above in order to impress the public with the fact that the electro-platers are a real unit in the industrial world.

Boston Branch

Boston branch met Friday, the 15th, the first time since last May, on account of the summer months, with President Nihan in the chair. After the regular order of business a motion was made to hold an open meeting some time in November to try and get more members. It was moved to bring it up at the next meeting, when more members will be present, and when the business of picking a committee for the next convention to be held at Providence, R. I., will be held. Different discussions were had lasting an hour or so, when the meeting adjourned at 10:15 P. M.

Cincinnati Branch

The Cincinnati Branch, A. E. S., held its second monthly meeting on Friday, September 15, at the Y. M. C. A. Building. Our meeting was well attended and everything went on in business-like form. After the meeting a discussion followed about converting a motor to a low current dynamo by building a new dynamo armature and leaving the motor field alone, but could not come to an entire agreement.

Grand Rapids Branch

Grand Rapids Branch held their last meeting September 13, 1922, but owing to some very unpleasant weather which prevailed at that time, there were only a few members out.

Grand Rapids Branch held their first picnic August 19, at Pine Island Lake, and everyone had a good time. The program, which was arranged by Mr. Charles Werft, called for a ball game and several contests for all, with prizes for the same. Dinner was served at 2 P. M. and it was some dinner and was enjoyed by all.

St. Louis Branch

On June 24 a special meeting was held at Mission Inn at 5 P. M., so that E. W. Heil (stopping over on way to the convention) could tell us about the results he was getting by the use of color indicators for acidity tests of nickel solutions. Mr. Heil will put this into a paper, so that it will be published. The St. Louis members appreciated Mr. Heil's visit and thanked him for bringing his test outfit with him.

A very fine lunch was served, then we adjourned, so that our members could get lined up for Cincinnati.

There will not be a meeting in July, but in August we have our annual outing at Belleville.

Detroit Branch

Regular monthly meeting of Detroit Branch, held Friday, August 4, President O. H. Phelps presiding. Visitors: Mr. Kelly, Mr. Hoy of Cleveland, Mr. Hemple from Texas, Frank Shepherd from Flint, Mr. McCann from Toronto, who in his talk reports that Mr. McGill has gone to a sanitarium.

Paper read at Cincinnati Convention, "Nickel Plating on Zinc," discussed.

From time to time there has been discussed in this branch the feasibility of japan on zinc or zinc deposit. Fortunately, Mr. F. D. Kuhry, one of the later live-wire members, submitted some very fine samples that had been on roof for 90 days, apparently as good as the day finished. Mr. Kuhry has kindly consented to get up a paper examining his process, which will be read at the next meeting, Friday, September 1, at 7 P. M., Board of Commerce Building, Wayne and Shelby. Mr. H. S. Brockway also gave a formula for sulphidizing before janening, that also eliminates the troubles encountered in japaning zinc.

Leave it to the home of the Magic Fluid to produce men who did not know "it couldn't be done." Pat Bergin was on hand with his abili for not reporting at Cincinnati Convention, but up to date he has failed to produce the amount of his fine. Some of the members threaten to take matters in their own hands, and Frank Shepherd of Flint also vows vengeance for being knocked into a sewer by Bergin's so-called automobile. A word to the wise is sufficient.

New York Branch

The regular meetings of New York Branch were held July 14-28, at Broadway Central Hotel, President I. Morningstar presiding. The July 14 meeting was devoted to reports of delegates to convention.

July 28 was under good and welfare, the following discussions taking place: Brown on snap fasteners, bright dip fasteners, pass through baruim sulphide solution until right color appears, dry in sawdust containing small amount of baruim solution. Black on zinc, small articles.

What are the advantages of using caustic potash in cyanide copper solutions? Adds conductivity; an excess causes a rough deposit; has no effect on anodes.

What is a good substitute for lacquer on copper and brass plated articles to prevent staining? Gelatine dissolved in hot water, a small amount of cream of tartar, pass work through.

Was moved and seconded no meetings to be held during the month of August.

Newark Branch

Newark held its regular meeting on July 21, with 21 members present, a result of President Sizelove's written appeal to many of the members who rarely attend the meetings.

The laboratory class now has 22 names added to its list. Mr. Faint

and Mr. Smith, the committee, are desirous of securing the names of every member on the laboratory class paper.

The discussion of the evening was opened by Librarian Edw. W. T. Faint taking the subject, "What I Know About Nickel," as his topic, which will extend over a period of many meetings. Specimens of nickel-plated parts were exhibited, which were pitted while being plated in a nickel solution which contained a fluoride. Considerable discussion took place upon the subject. Mr. Faint has started a topic which will become more interesting as he progresses into this deep subject.

One member having trouble with nickeled work rusting in one certain spot after being out on the market was given the following advice: Immerse article in heated vaseline and wipe off surplus.

A member desired to know how to oxidize nickel-silver. Use "platnig."

Discussion on the value of sal soda and soda ash as a rust preventative upon iron and steel during the process of manufacture brought out the fact that sal soda was preferred by those who have used both in soda kettles. Meeting adjourned at 11:45 P. M.

APPLICATIONS FOR MEMBERSHIP

Cincinnati Branch

Orville J. Enghauser.....1341 Mauss Ave., Cincinnati, O.

Cleveland Branch

Frank E. Hillet.....951 Ansel Road, Cleveland, O.

Newark Branch

Frank Dressel.....692 So. 20th St., Newark, N. J.

Chicago Branch

Active, Mr. J. P. Carlson.....208 N. Canal St., Chicago, Ill.
Active, Mr. Bur. Swisher.....1125 Fox St., South Bend, Ind.

Pittsburgh Branch

Active, Mr. Elmer J. Meyer

ELECTED TO MEMBERSHIP

Chicago Branch

Active, William J. Lotts.....162 N. Clinton St., Chicago, Ill.
Active, Louis Godfring.....706 Townsend St., Chicago, Ill.
Active, John Storbeck.....2033 N. Halsted St., Chicago, Ill.
Active, Carl William Borggren.....620 W. Monroe St., Chicago, Ill.
Active, George M. Westerberg.....620 W. Monroe St., Chicago, Ill.

St. Louis Branch

Active, Henry Driftmeyer.....119 Morgan Ave., Evansville, Ind.
Associate, Eugene S. Weil.....220 S. Commercial St., St. Louis, Mo.

Cleveland Branch

Mr. Frank E. Hillet.....951 Ansel Road, Cleveland, O.

Dayton Branch

Active, Robert M. Monce.....69 Lea Belle St., Dayton O.
Associate, Richard E. Maeder.....R. F. D. No. 13, Dayton, O.

REINSTATED

Chicago Branch

J. P. Luma.....4316 Wrightwood Ave., Chicago, Ill.

SUSPENDED

Detroit Branch

E. Baier.....742 Lawton Ave.
A. L. Burrows.....154 Cleveland Ave., Elyria, O.
F. C. Harrig .....Hall Lamp Co., Detroit, Mich.
Albert Leinnert.....44 Dragon St., Detroit, Mich.
Frank Shepperd.....326 Y. M. C. A. Bldg., Flint, Mich.
William Ream.....Buick Motor Co. Plant, 40 Flint
J. M. Smith.....317 Argyle Road, Watervilie, Ont.

Cincinnati Branch

C. M. Bradley.....611 Vine St., Dayton, Ky.

Philadelphia Branch

H. Kleinberg.....214-18 So. 12th St., Philadelphia, Pa.
J. Liebman.....2424 So. Darien St., Philadelphia, Pa.

Providence-Attleboro Branch

Active, Adolf W. Alsfeld
Active, Herbert A. Guldbransen
Active, Gaspard Gallernan
Active, William Hunchliffe
Active, L. R. Kelly
Active, Edmud L. Pagington
Active, Wilferd J. Masse

RESIGNED

Chicago Branch

E. S. Thompson

Newark Branch

Charles A. Stiehle John Higgens

Providence-Attleboro Branch

Associate, Park H. Masters

BOSTON

Regular meetings are held third Friday of each month, at 8 p. m., at the American House, Boston. Secretary, A. W. Garrett, 821 Dorchester Ave., Dorchester, Mass. Mass.

BRIDGEPORT

Meets third Friday of each month in its laboratory, 260 John St., Bridgeport, Conn. Secretary, Francis J. Spaine, 1323 N. Ave., Bridgeport, Conn.

CHICAGO

Meets second Saturday of each month, at 8 p. m., at the Hardware Club of Chicago, Room 1125. Secretary, F. J. Hanlon, 2921 George St., Chicago, Ill.

CINCINNATI

Meets on the first and third Friday of each month, at 1262 State Ave. Secretary, W. J. Husing, 729 McMakin Ave., Cincinnati, Ohio.

CLEVELAND

Meets last Saturday of each month at Hotel Winton. Secretary, B. F. McCormick, 2024 Wyandotte Ave., Lakewood, O.

CONNECTICUT VALLEY

Meets on the second Tuesday of each month at 202 Washington St., Hartford, Conn. Secretary, Tennant Elwin, Newington, Conn.

DAYTON

Meets first Saturday of each month at the Y. M. C. A., Dayton, Ohio. Secretary, C. Van Derau, 61 Bish Ave., Dayton, Ohio.

DETROIT

Meets first Friday of each month at the Board of Commerce, Lafayette and Sheldon, at 8 p. m. Secretary, E. W. Woodmensee, 1427 Lee Place, Detroit, Mich.

GRAND RAPIDS

Meets on the second Wednesday of each month at the Vocational High School, 129 Bostwick Ave., N.E. Secretary, J. Andrew Warner, 738 Fairview Ave., N.E., Grand Rapids, Mich.

INDIANAPOLIS

Meets the second Saturday of each month at Hotel Denison. Secretary, Louis Mertz, 1725 Union St., Indianapolis, Ind.

MILWAUKEE

Meets second and fourth Thursdays of each month at the West Side Bank Bldg. Secretary, R. Steuernagel, 1508 Concordia Ave., Milwaukee, Wis.

MONTREAL

Secretary, A. Geroux, 48 Craig West, Montreal, Quebec, Canada.

NEWARK

Meets first and third Fridays of each month at No. 17 Central Ave., Newark, N. J., at 8 p. m. Secretary, Royal F. Clark, 71 Chadwick Avenue, Newark, N. J.

NEW YORK

Meets second and fourth Fridays of each month at the Broadway Central Hotel Parlors, New York City. Secretary, John E. Sterling, 468 Grand Ave., Long Island City, N. Y.

PHILADELPHIA

Meets first Friday of each month in the Harrison Laboratory Building, University of Pennsylvania, 34th and Spruce Sts. Secretary, P. Uhl, 2432 North 29th St., Philadelphia, Pa.

PITTSBURGH

Meets first Saturday of each month at 8 p. m., at United States Bureau of Mines Bldg., Forbes St. Secretary, S. E. Hedden, 227 Fifth St., Aspinwall, Pa.

PROVIDENCE-ATTLEBORO

Meets first and third Thursday of each month at 26 Custom House St., Room 16. Secretary, C. J. Poyton, 269 Ohio Ave., Providence, R. I.

READING

Meets on the second Tuesday of each month. Secretary, William M. Fisher, 654 Gordon St., Reading, Pa.

ROCHESTER

Meets every second and fourth Saturday of each month at the Hotel Seneca. Albert H. Doering, Secretary, 49 Cutler St., Rochester, N. Y.

SYRACUSE

Secretary, M. J. Crean, 109 Court St., Syracuse, N. Y.

ST. LOUIS

Meets first Tuesday of each month at Barr Branch Library, corner Jefferson and Lafayette Sts. Secretary, H. H. Williams, 4156 Botanical Ave., St. Louis, Mo.

TOLEDO

Meets first Thursday of each month at Toledo University Science Building, Electro-Platers' Room, corner Cherry and Page Sts. Secretary, H. L. Myers, 410 Palmer, Toledo, Ohio.

TORONTO

Meets second Thursday of each month at Occident Hall, Bathurst and Queen Sts. Secretary, E. S. Turner, 873 St. Clair Ave., Toronto, Ontario, Canada.

WATERBURY

Meets every second and fourth Friday of each month. Secretary, Wm. Delage, 47 Prospect St., Waterbury, Conn.